OR

Describe the basic principle of experimental design.

Q.4 D. What is statistical Quality Control? Explain its causes and discuss its types. **(12)**

OR

With the help of following ANOVA table find out that the difference between the means of growth of bacteria is significant or not.

Given : Table value for V_1=3 & V_2=12 at 5 % level of significance = 3.489

---x---

Roll No..... Total No. of Units : 04
Total No. of Printed Pages : 03

Code No. : 02/407

Second Semester Examination, May 2019

M.Sc. MICROBIOLOGY

Paper - IV

BIOSTATISTICS

Time : 3 Hrs. **Max. Marks : 80**

- Part A and B of each question in each unit consist of very short answer type questions which are to be answered in one or two sentences.
  Part C (Short answer type) of each question should be answered in 200-250 words.
  Part D (Long answer type) of each question should be answered within the word limit 400-450.

Source of variation	Sum of squares	Degree of freedom	Mean square
Between samples	40	3	13.33
Within samples	188	12	15.66
Total	228	15	

Unit - I

Q.1 A. What do you mean by Viriable? Mention its types. **(2)**

Q.1 B. Differentiate between digram and graph with suitable example. **(2)**

Q.1 C. Define Table. Explain its objectives and mention parts of a table. **(4)**

OR

Draw histogram and frequency polygon from data given in the table.

Bacterial population isolated from soil/g

Time	April	May	June	July	August	September	October
No. of Colonies	41	58	73	51	86	95	69

Q.1 D. What is the need to classify a collected data? Mention the object of classification and discuss various types of classification. **(12)**

OR

The following data was obtained in a diversity experiment. Calculate mean, Median and Mode by grouped series. Number of colonies isolated from sources: 54, 50, 31, 33, 52, 58, 54, 35, 39, 51, 58, 50, 31, 36, 33, 35, 58, 50, 33, 58, 33, 31, 33, 58, 54 .

Unit - II

Q.2 A. Define Range with suitable example. **(2)**

Q.2 B. Give the formula for calculating standard deviation from individual and discrets series. **(2)**

Q.2 C. Calculate the mean deviation and its coefficient from the following data : 30, 40, 70, 20, 60, 50, 10 . **(4)**

OR

Explain the rules of calculating probabilities of occurrence of different events in an experiment.

Q.2 D. Discuss the various methods for ascertaining the relationship between two or more variables. **(12)**

OR

Observations were recorded for fungal and bacterial colonies isolated from soil. Find out whether there is any correlation between two variables by graphic method.

Variable	Jan.	Feb.	Mar.	April	May	June	July	Aug.
Bacteria	8	12	10	5	2	6	3	11
Fungi	6	9	15	12	8	7	5	13

Unit - III

Q.3 A. What is meant by Regression? **(2)**

Q.3 B. Write the applications of chi square test. **(2)**

Q.3 C. Explain the two possible types of errors in the test of a hypothesis. **(4)**

OR

Differentiate correlation and regression with suitable example.

Q.3 D. What is *f* test? Why it is done? Describe the properties of *f* test. **(12)**

OR

$x^2(p=0.05)=3.84$; $d.f.=1$

In a growth experiment, number of bacterial colonies isolated were as follows:

Calculate x^2 and interpret your result.

	Yellow	White	Total
Obseerned frequency (fo)	50	70	120
Expected frequency (fe)	60	60	120

Tabulated

Unit - IV

Q.4 A. What is ANOVA? **(2)**

Q.4 B. What do you mean by experimental design? **(2)**

Q.4 C. Describe one way ANOVA with suitable example. **(4)**

P.T.O.